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(54) Title: **COSMETIC COMPOSITIONS WITH SELF-WARMING COMPONENT**

(57) Abstract: **The present invention provides self-warming composition comprising a skin conditioning agent, and a redox system based on iron powder and a high surface area catalyst. The system is activated with moisture and/or air.**

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COSMETIC COMPOSITIONS
WITH SELF-WARMING COMPONENT

BACKGROUND OF THE INVENTION

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Field of the Invention

The present invention relates to cosmetic compositions in the form of strips, patches, skin liquids, creams, gels or pastes, which can evolve heat when in contact with moisture.

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The Related Art

Heat-producing cosmetic compositions produce a very pleasant sensation. These formulations are friendlier than the traditional cold products applied to the skin. There are a number of prior art documents relating to the generation of warmth.

U.S. Patent 3,250,680 (Menkart et al.) reports the use of finely divided solid adsorbent materials, which are capable of exothermically reacting with water. Illustrative of these materials are silica gel, activated alumina and synthetic zeolites. U.S. Patent 4,626,550 (Hertzenberg) discloses similar heating systems comprising zeolite and potassium ions as replacement for some of the sodium ions. A still further elaboration is found in WO 93/08793 (Kemp et al.), reporting other exothermic agents reactive with water. These include kaolin, Fuller's Earth, china clay and bentonite.

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A common problem with the known art is the requirement for very high levels of water reactive solids. Without a significant concentration of those solids, the temperature increase will be relatively small. There is a need for cosmetic compatible systems achieving much higher heat output per gram of heating agent. High levels of solid heating agents cause further problems such as thickening of the compositions so that they are not readily flowable.

10 Accordingly, it is an advantage of the present invention to provide cosmetic compositions adapted to be self-warming and which rely upon highly efficient heat generating systems.

15 Another advantage of the present invention is to provide cosmetic compositions adapted to be self-warming wherein the heating agents are present at levels insufficient to prevent the product from flowing easily.

20 These and other advantages of the present invention will become more readily apparent from consideration of the following summary and detailed discussion.

SUMMARY OF THE INVENTION

25 The present invention provides self-warming cosmetic compositions, which comprise:

- (i) from about 0.1 to about 99% by weight of a skin conditioning agent; and
 - (ii) from about 0.1 to about 95% by weight of a redox system based upon iron powder and a high surface area catalyst.
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DETAILED DESCRIPTION OF THE INVENTION

The present applicants have found that highly efficient
5 heating of cosmetic compositions can be achieved by use of
iron redox systems. The heat generated can give an
aesthetically pleasant sensation to the skin and can assist
in delivery of skin conditioning agents by opening skin
pores to allow more effective penetration.

10

An essential element of the present invention is an iron
redox system. Central to the system is iron powder. By the
term iron powder is meant elemental iron, iron oxides and
ferrous salts which can be oxidized to the ferric oxidation
15 state, and combinations thereof. Oxygen is delivered to the
system via an aqueous phase which allows mixing with the
iron powder. The combination of iron and air is activated
by a catalyst. Preferably the catalyst is a substance which
increases surface area contact of the reactants. Most
20 preferred is activated charcoal but other high surface area
solids may also be useful. Alternative catalysts include
alumina, aluminosilicates, silica and a variety of clays.
Although not vital to the reaction, water absorbents such as
Vermiculite may be utilised as an inexpensive water
25 reservoir. Vermiculite is an aluminium-iron magnesium
silicate. In certain systems salts such as sodium chloride
may be employed to further assist the reaction. Certain
amounts of water can also be originally present to initiate
the heating reaction. Access to air should be limited. Air
30 (and aerated water) initiates the reaction. Cosmetic

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product dispensers which seal the product from the atmosphere during storage periods are preferred.

The amount of the iron powder may range from about 0.1 to about 95%, preferably from about 2 to about 50%, more preferably from about 5 to about 30%, optimally from about 10 to about 20% by weight of the cosmetic composition. The amount of catalyst may range from about 0.01 to about 30%, preferably from about 0.1 to about 10%, optimally from about 1 to about 5% by weight of the cosmetic composition. When present the Vermiculite or equivalent substance may be present from about 0.01 to about 30%, preferably from about 0.1 to about 10%, optimally from about 0.5 to about 3% by weight of the cosmetic composition. Salts when present in the composition may range from about 0.001 to about 15%, preferably from about 0.01 to about 10%, optimally from about 0.5 to about 8% by weight of the cosmetic composition. The weight ratio of iron powder to catalyst may range from about 1000:1 to about 1:1000, preferably from about 100:1 to about 1:1, optimally from about 10:1 to about 2:1.

Another important element is a skin conditioning agent. These agents may be selected from emollients, petrolatum, fatty acids, humectants, surfactants, keratolytic agents, retinoids, quaternary ammonium polymers, sunless tanning agents and mixtures thereof.

Collectively the skin conditioning agents will constitute from about 0.1 to about 99%, preferably from about 1 to about 80%, more preferably from about 5 to about 70%.

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optimally from about 10 to about 30% by weight of the cosmetic compositions.

Emollient materials may serve as skin conditioning agents.

- 5 These may be in the form of silicone oils and carboxylic esters. Amounts of the emollients may range from about 0.1 to about 30%, preferably from about 1 to about 20% by weight.

- 10 Silicone oils may be divided into the volatile and non-volatile varieties. The term "volatile" as used herein refers to materials that have a measurable vapour pressure at ambient temperature. Volatile silicone oils are preferably chosen from cyclic or linear
- 15 polydimethylsiloxanes containing from 3 to 9, preferably from 4 to 5, silicon atoms.

- Linear volatile silicone materials generally have viscosities of less than about 5 centistokes at 25°C while
- 20 cyclic materials typically have viscosities of less than about 10 centistokes.

- Non-volatile silicone oils useful as emollient materials include polyalkyl siloxanes, polyalkylaryl siloxanes and
- 25 polyether siloxane copolymers. The essentially non-volatile polyalkyl siloxanes useful herein include, for example, polydimethyl siloxanes with viscosities of from about 5 to about 100,000 centistokes at 25°C. Among the preferred non-volatile emollients useful in the present compositions

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are the polydimethyl siloxanes having viscosities of from about 10 to about 400 centistokes at 25°C.

Suitable ester emollients include:

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- (1) Alkenyl or alkyl esters of fatty acids having from 10 to 20 carbon atoms. Examples thereof include isoarachidyl neopentanoate, isononyl isononanoate, oleyl myristate, oleyl stearate, and oleyl oleate.

10

- (2) Ether-esters such as fatty acid esters of ethoxylated fatty alcohols.

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- (3) Polyhydric alcohol esters. Ethylene glycol mono- and di-fatty acid esters, diethylene glycol mono- and di-fatty acid esters, polyethylene glycol (200-6000) mono- and di-fatty acid esters, propylene glycol mono- and di-fatty acid esters, polypropylene glycol 2000 monooleate, polypropylene glycol 2000 monostearate, ethoxylated propylene glycol monostearate, glyceryl mono- and di-fatty acid esters, polyglycerol poly-fatty esters, ethoxylated glyceryl monostearate, 1,3-butylene glycol monostearate, 1,3-butylene glycol distearate, polyoxyethylene polyol fatty acid ester, sorbitan fatty acid esters, and polyoxyethylene sorbitan fatty acid esters are satisfactory polyhydric alcohol esters.

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- (4) Wax esters such as beeswax, spermaceti, myristyl myristate, stearyl stearate and arachidyl behenate.
- 5 (5) Sterols esters, such as cholesterol fatty acid esters.

Fatty acids having from 10 to 30 carbon atoms may also be used as skin conditioning agents for compositions of this invention. Examples of these fatty acids include pelargonic, lauric, myristic, palmitic, stearic, isostearic, hydroxystearic, oleic, linoleic, ricinoleic, arachidic, behenic and erucic acids.

- 15 Humectants of the polyhydric alcohol-type may also be employed as skin conditioning agents for compositions of this invention. The humectant has several advantages including increasing the effectiveness of emollients, reducing scaling, stimulating removal of built-up scale and
- 20 improveing skin feel. Typical polyhydric alcohols include glycerol, polyalkylene glycols and more preferably alkylene polyols and their derivatives, including propylene glycol, dipropylene glycol, polypropylene glycol, polyethylene glycol and derivatives thereof, sorbitol, hydroxypropyl
- 25 sorbitol, hexylene glycol, 1,3-butylene glycol, 1,2,6-hexanetriol, ethoxylated glycerol, propoxylated glycerol and mixtures thereof. For best results the humectant is preferably propylene glycol. The amount of humectant may range from 0.5 to 30%, preferably from 1 to
- 30 15% by weight of the composition.

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Surfactants may also be present in compositions of the present invention. The total concentration of the surfactants may range from about 0.1 to about 40%, preferably from about 1 to about 20%, optimally from about 1 to about 5% by weight of the composition. The surfactant may be selected from the group consisting of anionic, nonionic, cationic and amphoteric actives.

Particularly preferred nonionic surfactants are those with a C₁₀-C₂₀ fatty alcohol or acid hydrophobe condensed with from 2 to 100 moles of ethylene oxide or propylene oxide per mole of hydrophobe; C₂-C₁₀ alkyl phenols condensed with from 2 to 20 moles of alkylene oxide; mono- and di- fatty acid esters of ethylene glycol; fatty acid monoglyceride; sorbitan, mono- and di- C₈-C₂₀ fatty acids; block copolymers (ethylene oxide/propylene oxide); and polyoxyethylene sorbitan as well as combinations thereof. Alkyl polyglycosides and saccharide fatty amides (e.g. methyl gluconamides) are also suitable nonionic surfactants.

Preferred anionic surfactants include soap, alkyl ether sulfate and sulfonates, alkyl sulfates and sulfonates, alkylbenzene sulfonates, alkyl and dialkyl sulfosuccinates, C₈-C₂₀ acyl isethionates, acyl glutamates, C₈-C₂₀ alkyl ether phosphates and combinations thereof.

Keratolytic agents such as C₂-C₂₅ alpha-hydroxy carboxylic and beta-hydroxycarboxylic acids and their salts are useful skin conditioning agents of this invention. Illustrative

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materials are glycolic, lactic, salicylic, alpha-hydroxy-octanoic acids and salts thereof. The salts may be selected from alkalimetal, ammonium and C₁-C₂₀ alkyl or alkanolammonium counterions. Levels of these keratolytic agents may range from about 0.001 to about 10%, preferably from about 0.2 to about 8%, optimally from about 1 to about 4% by weight.

Retinoids useful as skin conditioning agents may include retinol, retinoic acid and C₁-C₂₂ esters of retinol such as retinyl palmitate, retinyl acetate and retinyl linoleate. The amount of retinoid may range from about 0.0001 to about 1% by weight.

Quaternary ammonium polymers useful as skin conditioning agents include guar hydroxypropyltrimonium chloride available as Jaguar C134S and Polymer JR. The amount of such polymers used may range from about 0.01 to about 10%, preferably from about 0.1 to about 1% by weight.

Sunless tanning agents useful for this invention include dihydroxyacetone and sugars such as xylitol. The amount of such agents may range from about 0.1 to about 15% by weight.

Thickeners may be utilised as a pharmaceutically acceptable carrier of compositions according to the present invention. Typical thickeners include cross-linked acrylates (e.g. Carbopol 9827), hydrophobically-modified acrylates (e.g. Carbopol 13827), cellulosic derivatives and natural gums. Among useful cellulosic derivatives are sodium

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- carboxymethylcellulose, hydroxypropyl methylcellulose, hydroxypropyl cellulose, hydroxyethyl cellulose, ethyl cellulose and hydroxymethyl cellulose. Natural gums suitable for use in the present invention include guar, xanthan, sclerotium, carrageenan, pectin and combinations of these gums. The amount of the thickeners may range from 0.0001 to 5%, usually from 0.001 to 1%, optimally from 0.01 to 0.5% by weight.
- Preservatives can desirably be incorporated into the compositions of this invention to protect against the growth of potentially harmful microorganisms. Suitable traditional preservatives for use in the compositions of this invention are alkyl esters of para-hydroxybenzoic acid. Other preservatives which have more recently come into use include hydantoin derivatives, propionate salts, and a variety of quaternary ammonium compounds. Cosmetic chemists are familiar with appropriate preservatives and routinely choose them to satisfy the preservative challenge test and to provide product stability. Particularly preferred preservatives are phenoxyethanol, methyl paraben, propyl paraben, imidazolidinyl urea, sodium dehydroacetate and benzyl alcohol. The preservatives should be selected having regard for the use of the composition and possible incompatibilities between the preservatives and other ingredients in the emulsion. Preservatives are preferably employed in amounts ranging from 0.01% to 2% by weight of the composition.
- Minor adjunct ingredients may also be present in the compositions. Among these may be the water-insoluble

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vitamins such as vitamin A palmitate, vitamin E acetate and DL-panthenol.

Colorants, fragrances, opacifiers and abrasives may also be included in compositions of the present invention. Each of these substances may be present in an amount of from about 0.05 to about 5%, preferably from 0.1 to 3% by weight.

Cosmetic compositions of the present invention may be in any form. These forms may include emulsified systems such as lotions and creams, microemulsions, roll-on formulations, mousses, ointments (hydrophilic and hydrophobic), aerosol and non-aerosol sprays, strips or patches and pad-applied formulations. When the compositions are impregnated onto a strip, patch or pad, the substrate textile may be a woven or non-woven material of synthetic or natural fiber. Suitable synthetic materials include polyethylene, polypropylene, polyamide, polyester, polyurethane, rayon and combinations thereof. Natural fibers include cellulose such as cotton, wood pulp, wool, linen and combinations thereof. Mixed natural and synthetic fibers can be employed. The relative weight ratio of redox system to substrate is typically from about 1:1000 to 5:1, preferably from about 1:100 to about 1:50, optimally from about 1:30 to about 1:2.

Except in the operating and comparative Examples, or where otherwise explicitly indicated, all numbers in this description indicating amounts of material ought to be understood as modified by the word "about".

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The following Examples will more fully illustrate embodiments of this invention. All parts, percentages and proportions referred to herein and in the appended claims are by weight unless otherwise indicated.

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EXAMPLE 1

A warming facial mask formulation is reported in Table I.

10 **TABLE I**

COMPONENT	WEIGHT %
PHASE A	
Butylene Glycol	42.00
Hydroxypropyl Cellulose	0.80
Sodium Magnesium Silicate	0.50
Phase B	
PEG-8	4.00
Methyl Gluceth-20	0.60
Dimethicone Copolyol	0.60
Phase C	
Iron Powder	30.00
Charcoal	7.00
Vermiculite	3.50
Kaolin	10.00
Phase D	
Fragrance	0.50
Herbal Extracts	0.50

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EXAMPLE 2

An anti-ageing skin system based on a retinoid active is reported under Table II.

5

TABLE II

COMPONENT	WEIGHT %
Cyclomethicone	36.00
Crosslinked Polysiloxane Elastomer in Cyclomethicone (25% Active)	24.00
Butylene Glycol	17.50
Iron Powder/Charcoal (4:1 weight ratio)	10.00
Dimethyl Isosorbide	2.00
Retinyl Linoleate	0.50
Cetyl Dimethicone Copolyol	0.80
Water	Balance

10 EXAMPLE 3

This Example illustrates a sunless tanner type formulation details of which are recorded in Table III.

15 TABLE III

COMPONENT	WEIGHT %
Petrolatum	18.50
Cyclomethicone	41.50
Iron Powder/Charcoal (5:1 weight ratio)	30.00
Dihydroxyacetone	5.00
Water	4.00
Cetyl Dimethicone Copolyol	1.00

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Activation of this system was achieved by wetting the face with aerated water prior to application of the sunless tanning agent. A warm sensation occurred through operation of the redox system while the dihydroxyacetone bronzed the skin. By this treatment the consumer had the combined aesthetic feel of sunshine warmth and the resultant color of a natural tan without being exposed to harmful ultraviolet radiation.

10 EXAMPLE 4

This Example illustrates a shampoo incorporating the redox system of the present invention. Table IV lists the shampoo composition.

15

TABLE IV

COMPONENT	WEIGHT %
Sodium Lauryl Ether Sulfate	16.00
Cocoamidopropylbetaine	2.00
Silicone Microemulsion	4.00
Jaquar C13S	0.10
Ethyene Glycol Distearate	2.00
Fragrance	1.00
Iron Powder/Charcoal (10:1 weight ratio)	10.00
Polyethylene Glycol 200	Balance

The above shampoo concentrate was delivered to the hair and wetted. Heat and lather were generated by the addition of a small amount of water. The consumer felt the aesthetic pleasure of warmth onto the scalp and foam providing good skin-feel to the fingers as the head was being massaged.

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The head was then rinsed clear of the composition. The shampoo could be reapplied and followed again by rinsing.

EXAMPLE 5

5

This Example illustrates a shaving cream according to the present invention. Table V lists components of the self-heating shaving cream.

10 **TABLE V**

COMPONENT	WEIGHT %
PHASE A	
Cetyl Alcohol	30.00
Glycerin	15.00
Iron/Charcoal (4:1 weight ratio)	20.00
PEG 40 Diisostearate	1.00
PHASE B	
Propylene Glycol	15.00
Preservative	1.00
Triethanolamine	1.00
Water	Balance

The foregoing description and Examples illustrate selected embodiments of the present invention. In the light thereof variations and modifications will be suggested to one skilled in the art, all of which are within the spirit and purview of this invention.

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CLAIMS:

1. A self-warming composition comprising:
 - (i) from about 0.1 to about 99% by weight of a skin conditioning agent; and
 - (ii) from about 1 to about 95% by weight of a redox system based on iron powder and a high surface area catalyst.
2. A composition according to claim 1, wherein the iron powder and catalyst are present in a weight ratio of from about 1000:1 to about 1:1000.
3. A composition according to claim 2, wherein the weight ratio is from about 10:1 to about 2:1.
4. A composition according to any one of the preceding claims, wherein the catalyst is alumina, aluminosilicate, silica, clay or charcoal, particularly charcoal.
5. A composition according to any one of the preceding claims, additionally comprising a water absorbent.
6. A composition according to any one of the preceding claims, additionally comprising a salt.
7. A composition according to any one of the preceding claims, wherein the iron powder comprises from 2 to 95% by weight of the cosmetic composition.

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8. A composition according to any one of the preceding claims, wherein the catalyst comprises from 0.01 to 30% by weight of the cosmetic composition.

5 9. A composition according to any one of the preceding claims, wherein the skin conditioning agent is selected from the group consisting of emollients, petrolatum, fatty acids, humectants, surfactants, keratolytic agents, retinoids, quaternary ammonium polymers, sunless tanning agents and
10 mixtures thereof.

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Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

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C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 5 879 378 A (USUI AKIO) 9 March 1999 (1999-03-09) column 7, line 48 - column 9, line 59 column 14, line 43 - line 51; claims ---	1-9
X	DATABASE WPI Section Ch, Week 199513 Derwent Publications Ltd., London, GB; Class B04, AN 1995-091265 XP002901386 & CN 1 079 156 A (FAN Z), 8 December 1993 (1993-12-08) abstract --- -/--	1-8

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT		
Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
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